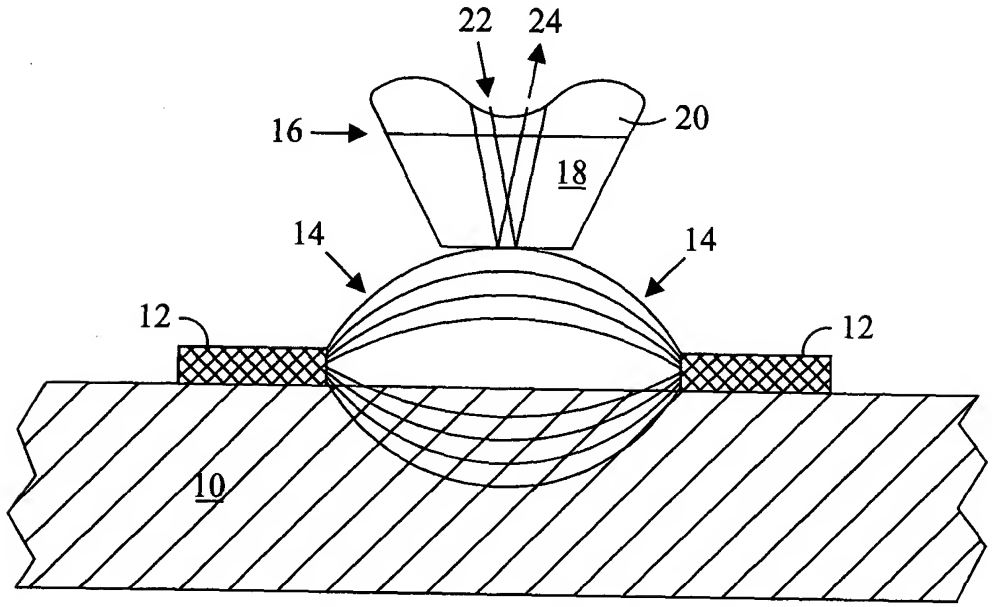

22
24
16
20
18
14
14
12
12
10

FIG. 1

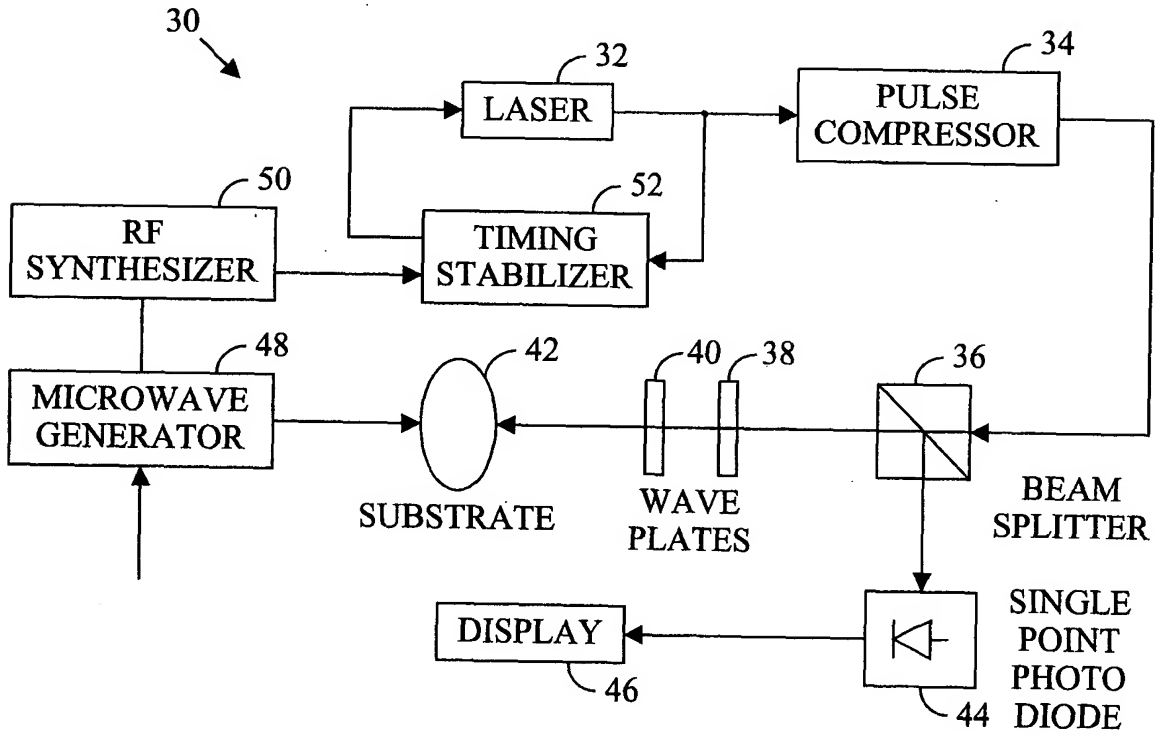

30
32
LASER
34
PULSE COMPRESSOR
50
RF SYNTHESIZER
52
TIMING STABILIZER
48
MICROWAVE GENERATOR
42
40
38
36
SUBSTRATE
WAVE PLATES
BEAM SPLITTER
DISPLAY
46
SINGLE POINT PHOTO DIODE
44

FIG. 2

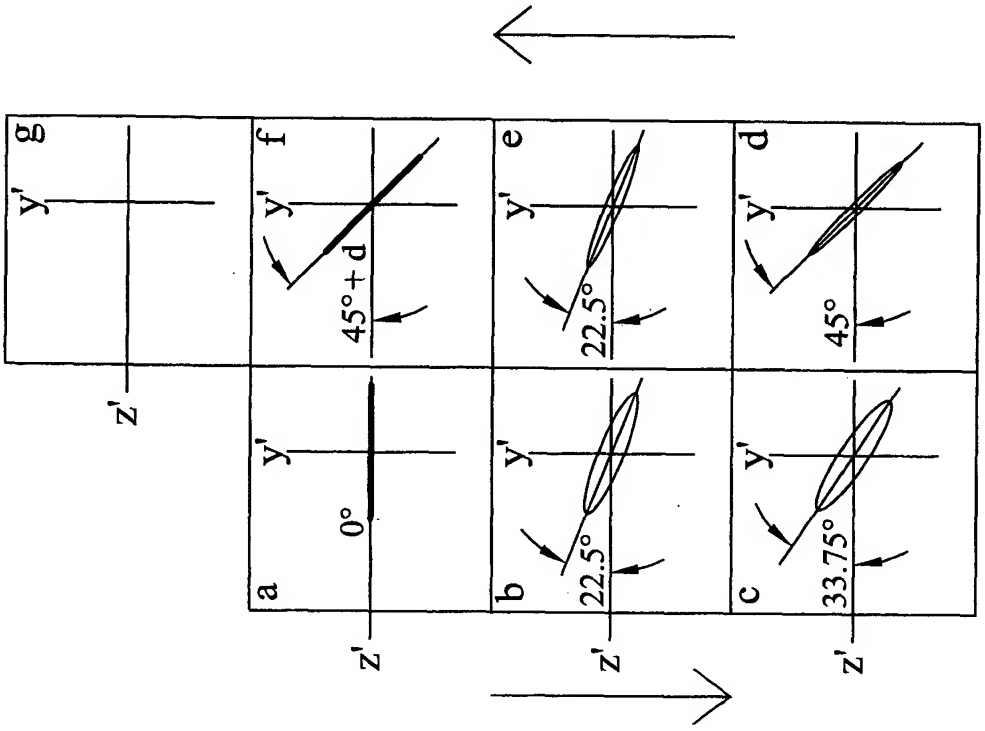

g
f
e
d
y'
z'
45°+d
22.5°
45°
0°
a
b
c
33.75°

FIG. 3B

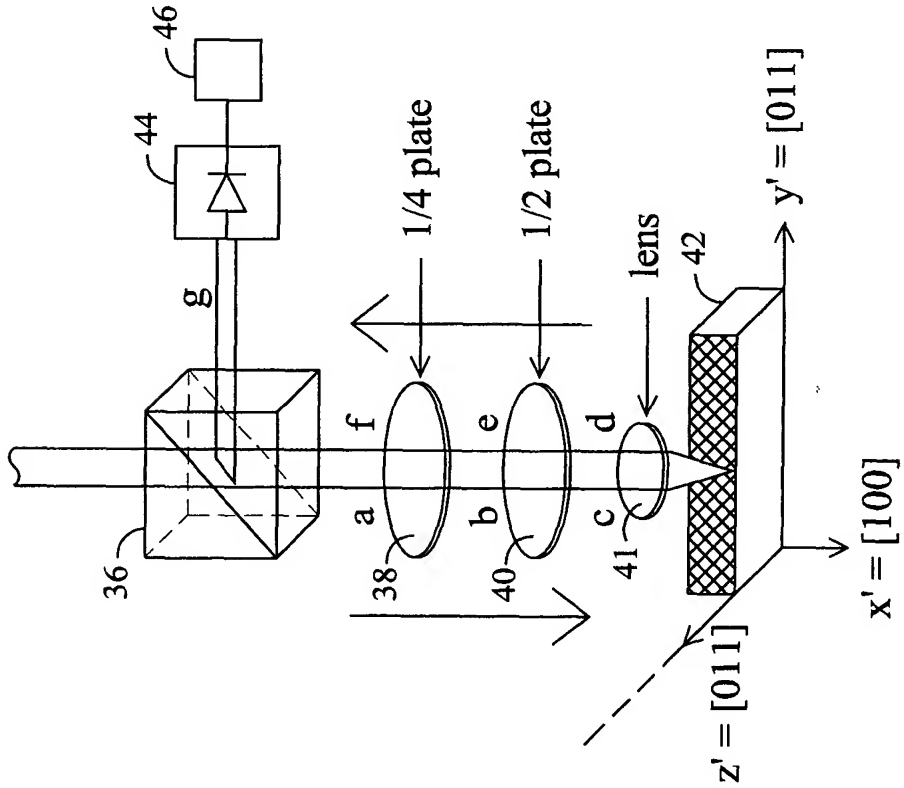

46
44
g
1/4 plate
1/2 plate
lens
42
y' = [011]
x' = [100]
z' = [011]
f
e
d
a
b
c
36
38
40
41

FIG. 3A

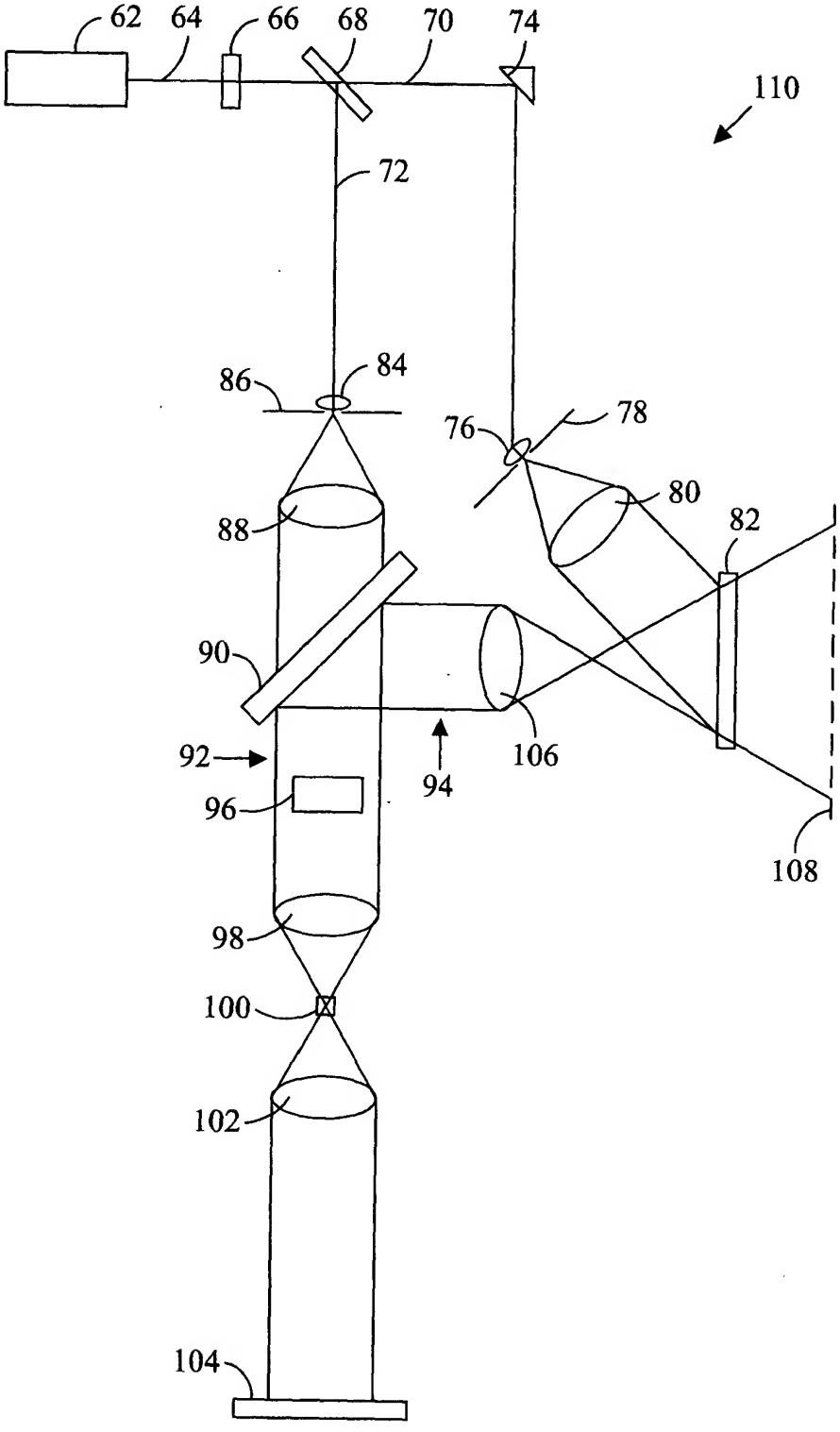

62
64
66
68
70
74
110
72
86
84
76
78
80
82
88
90
92
94
106
96
108
98
100
102
104

FIG. 4

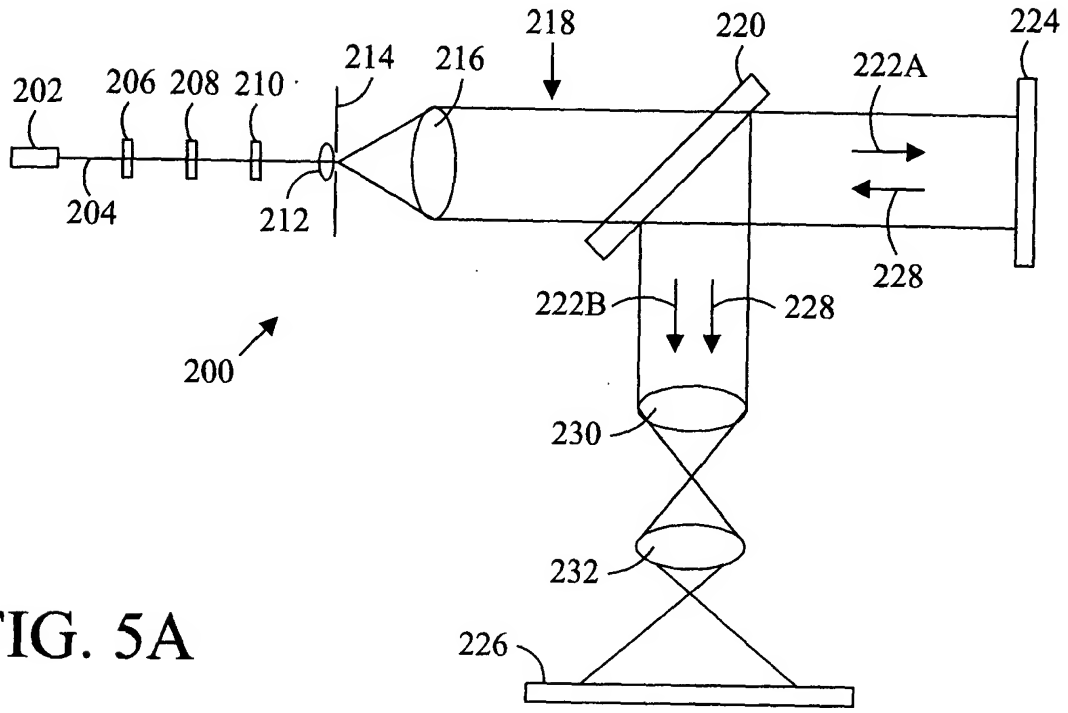

202
206
208
210
214
216
218
220
222A
224
204
212
228
222B
228
200
230
232
226

FIG. 5A

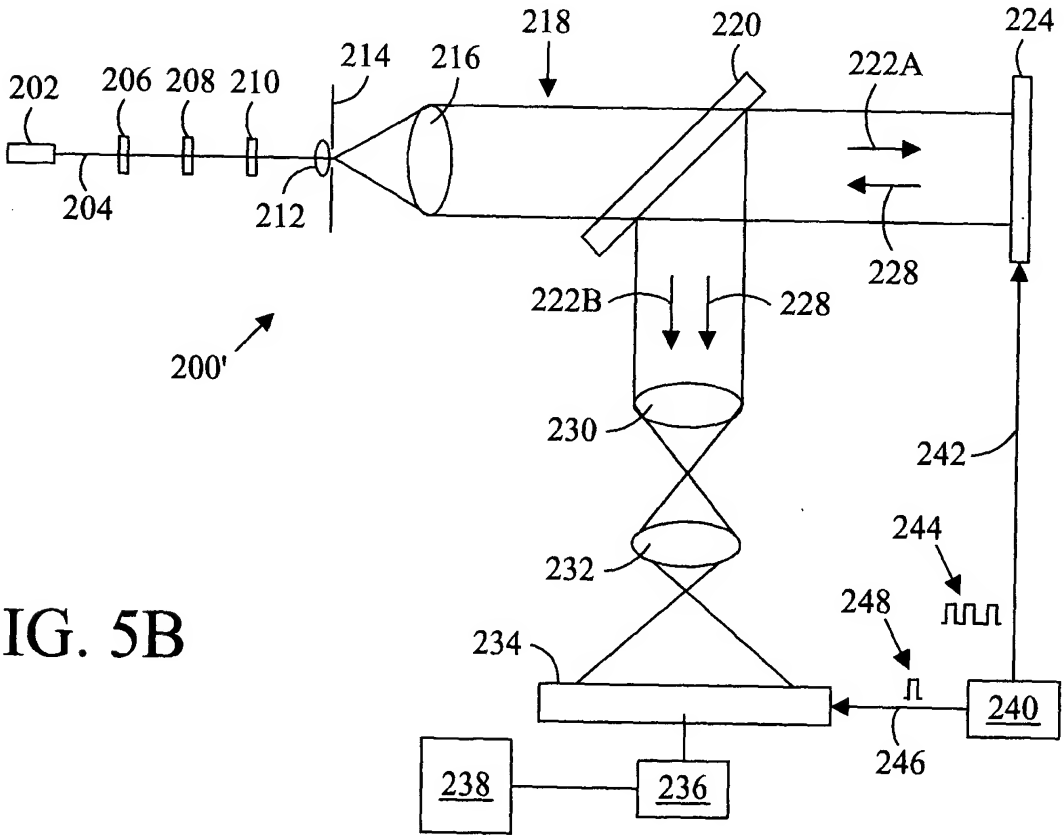

202
206
208
210
214
216
218
220
222A
224
204
212
228
222B
228
200'
230
242
244
232
248
234
240
246
238
236

FIG. 5B

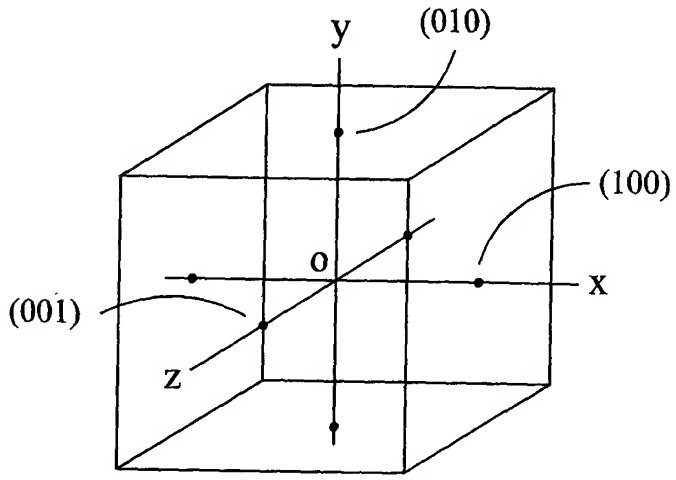


FIG. 6A

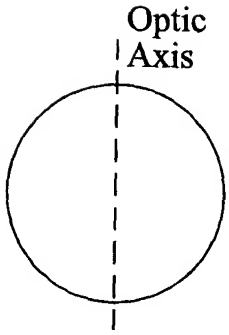


FIG. 6B

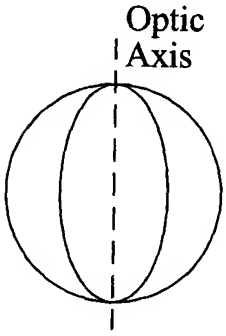


FIG. 6C

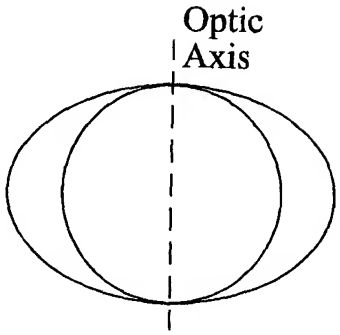


FIG. 6D

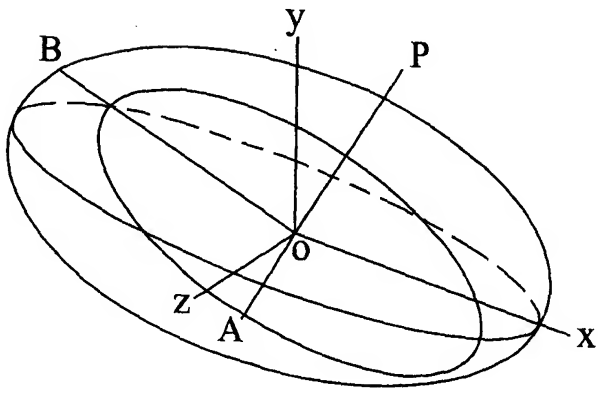


FIG. 6E

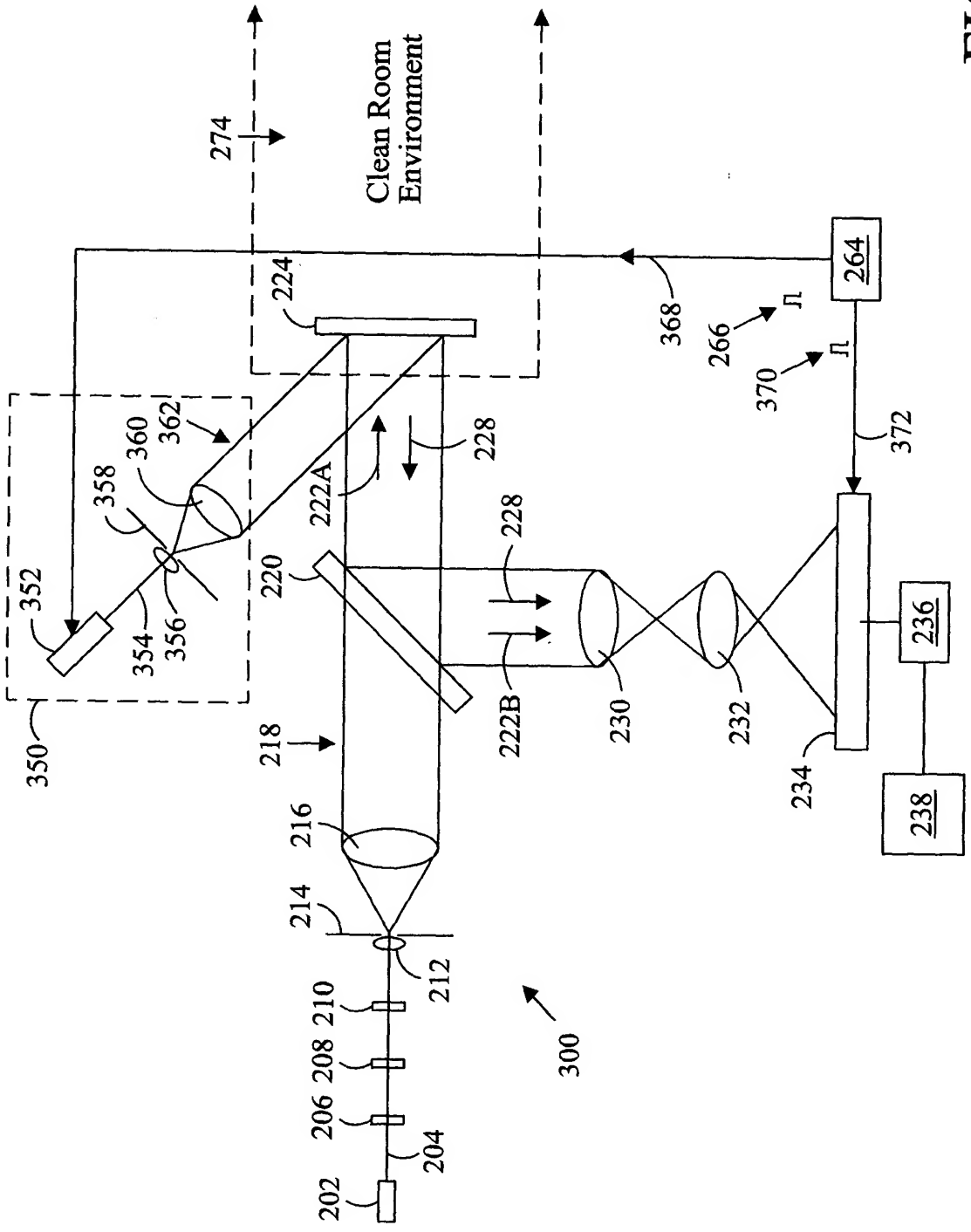

Clean Room Environment
274
224
264
368
266
370
372
228
222A
360
362
358
352
354
356
220
228
222B
230
232
236
234
238
350
218
216
214
212
210
208
206
204
202
300

FIG. 7

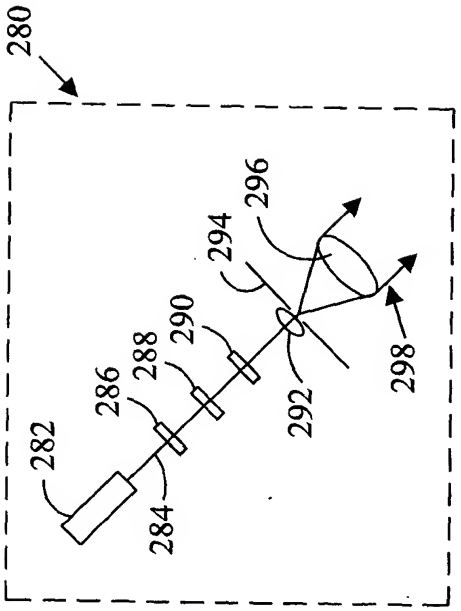

280
282
284
286
288
290
292
294
296
298

FIG. 8

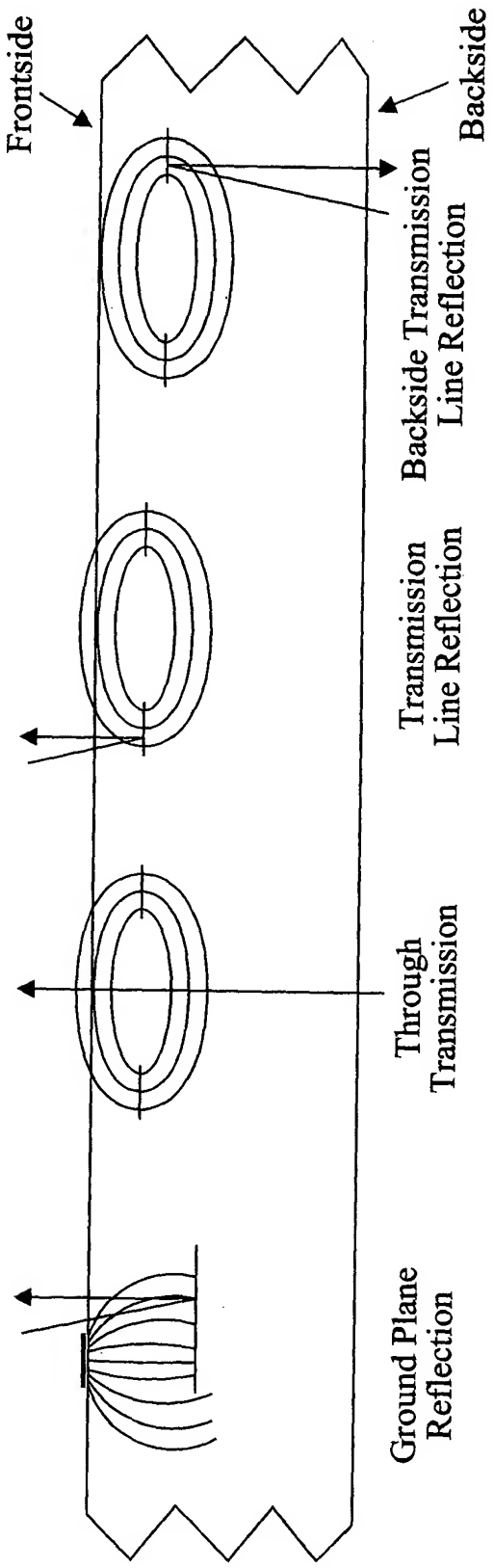

Frontside
Backside
Backside Transmission Line Reflection
Transmission Line Reflection
Through Transmission
Ground Plane Reflection

FIG. 9

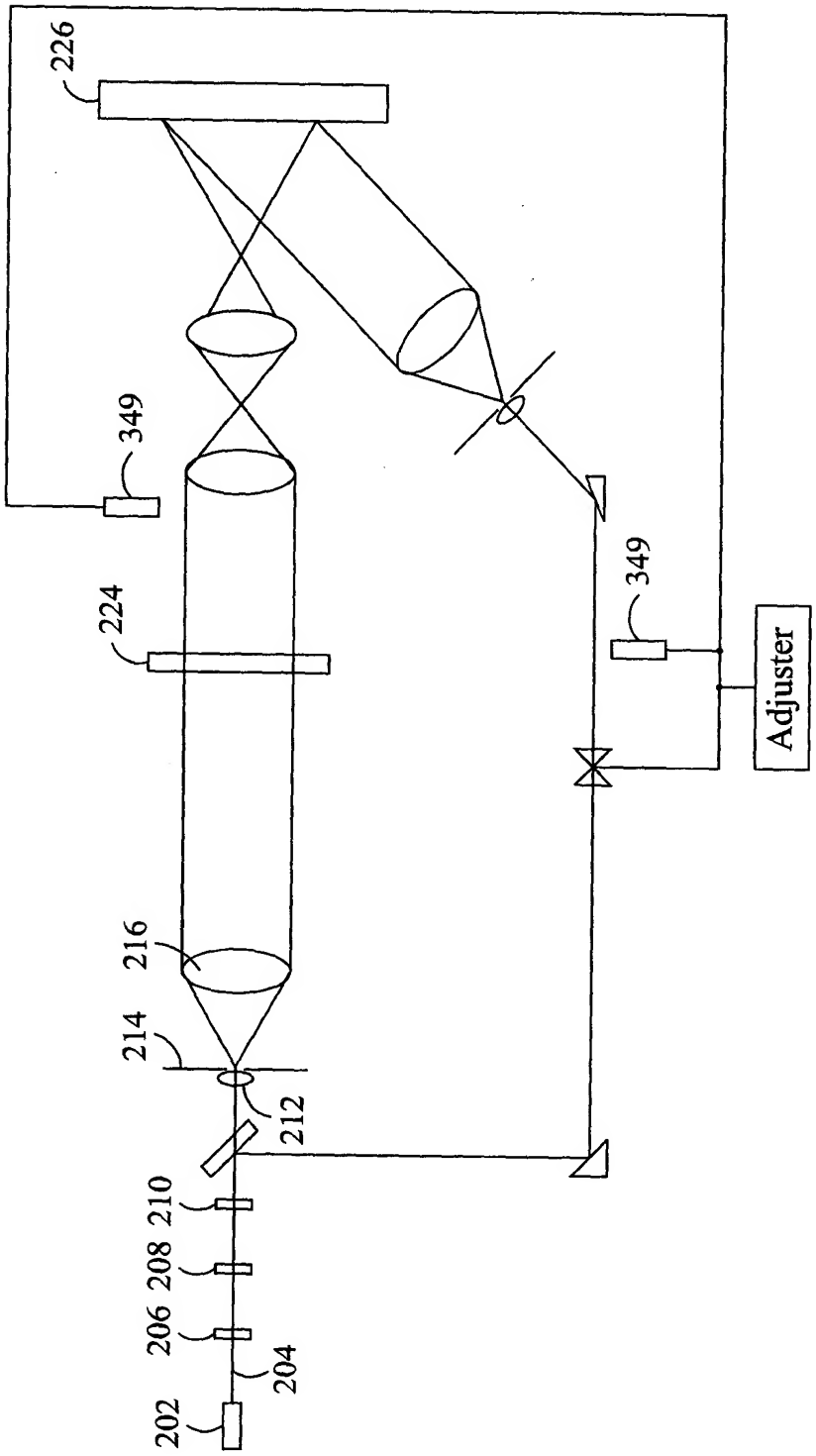


FIG. 10

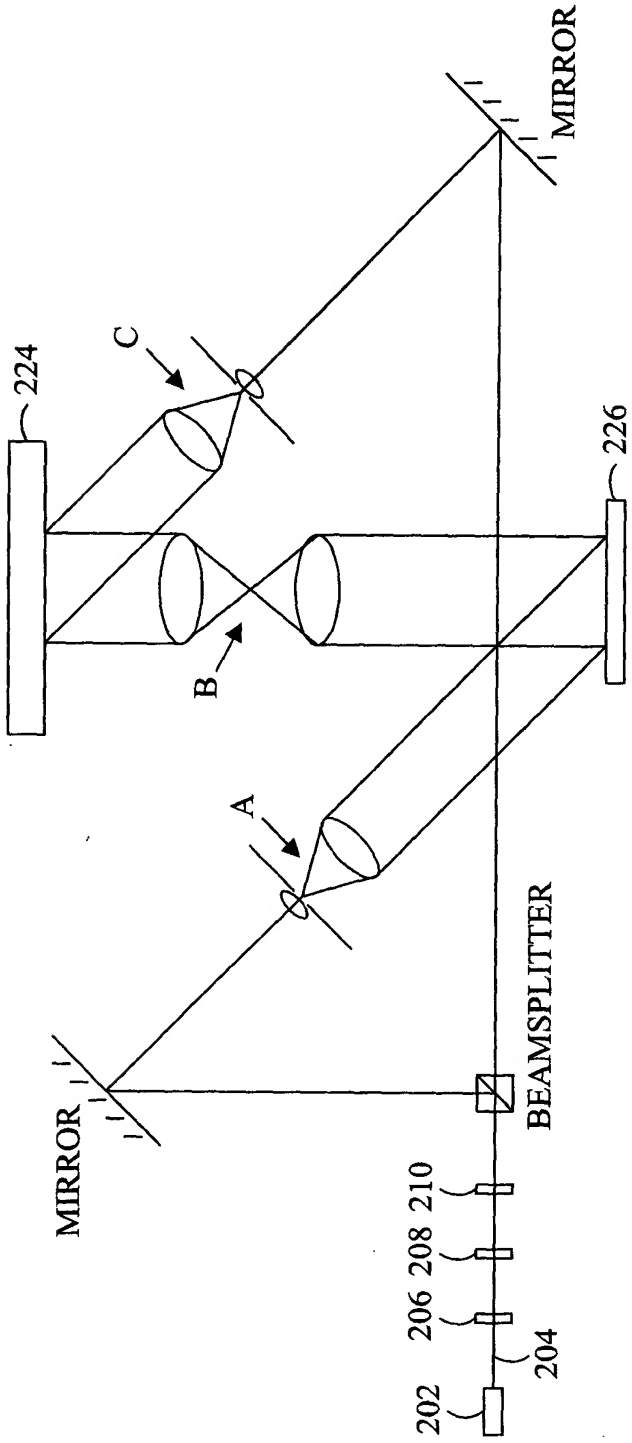


FIG. 11

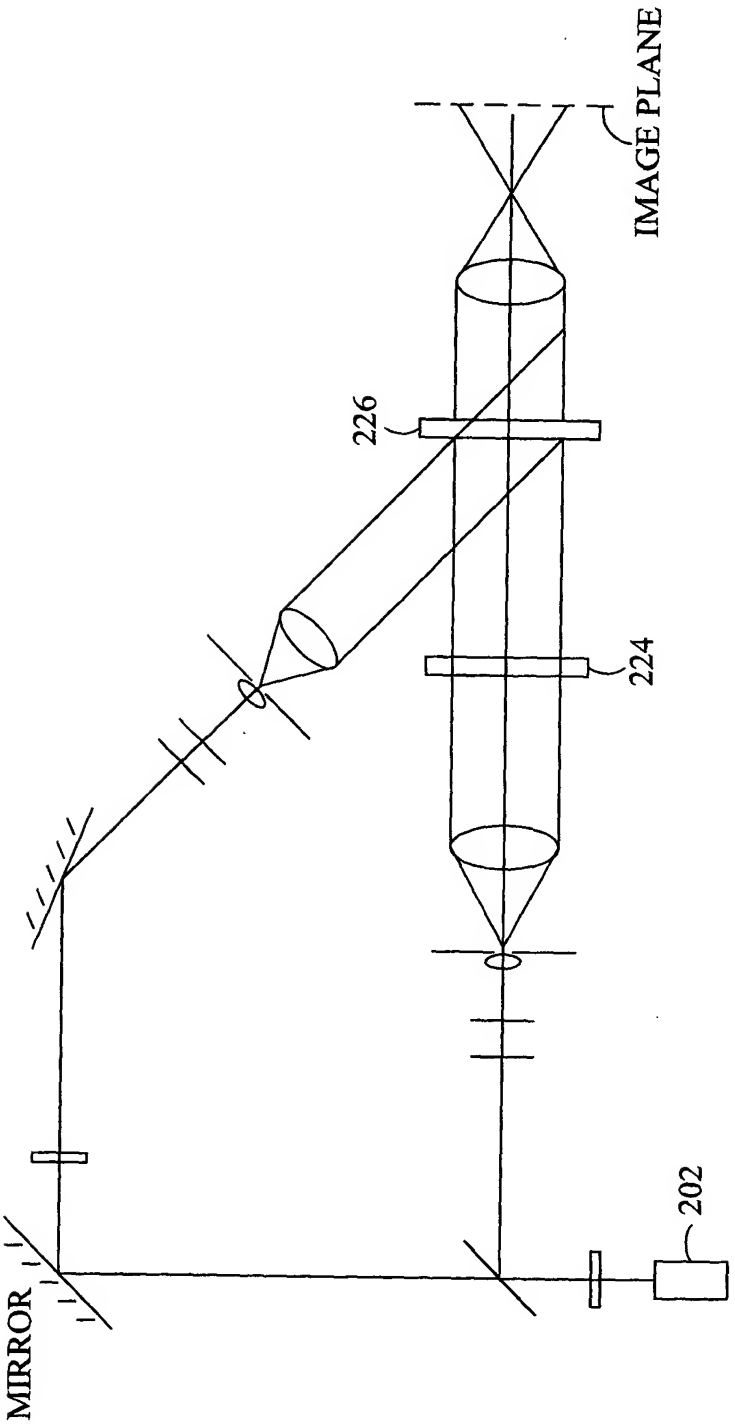


FIG. 12

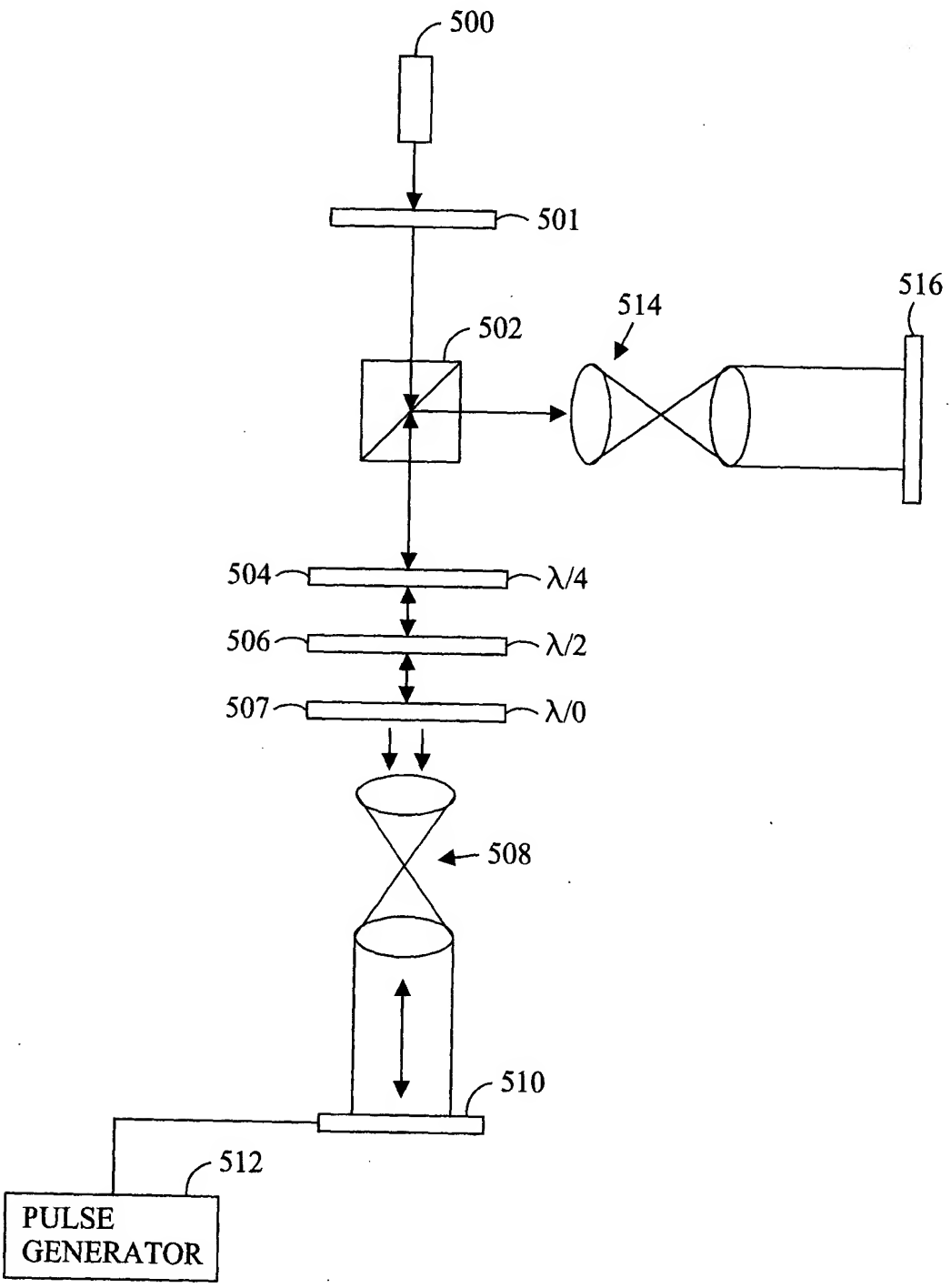

500
501
502
514
516
504
λ/4
506
λ/2
507
λ/0
508
510
512
PULSE GENERATOR

FIG. 13

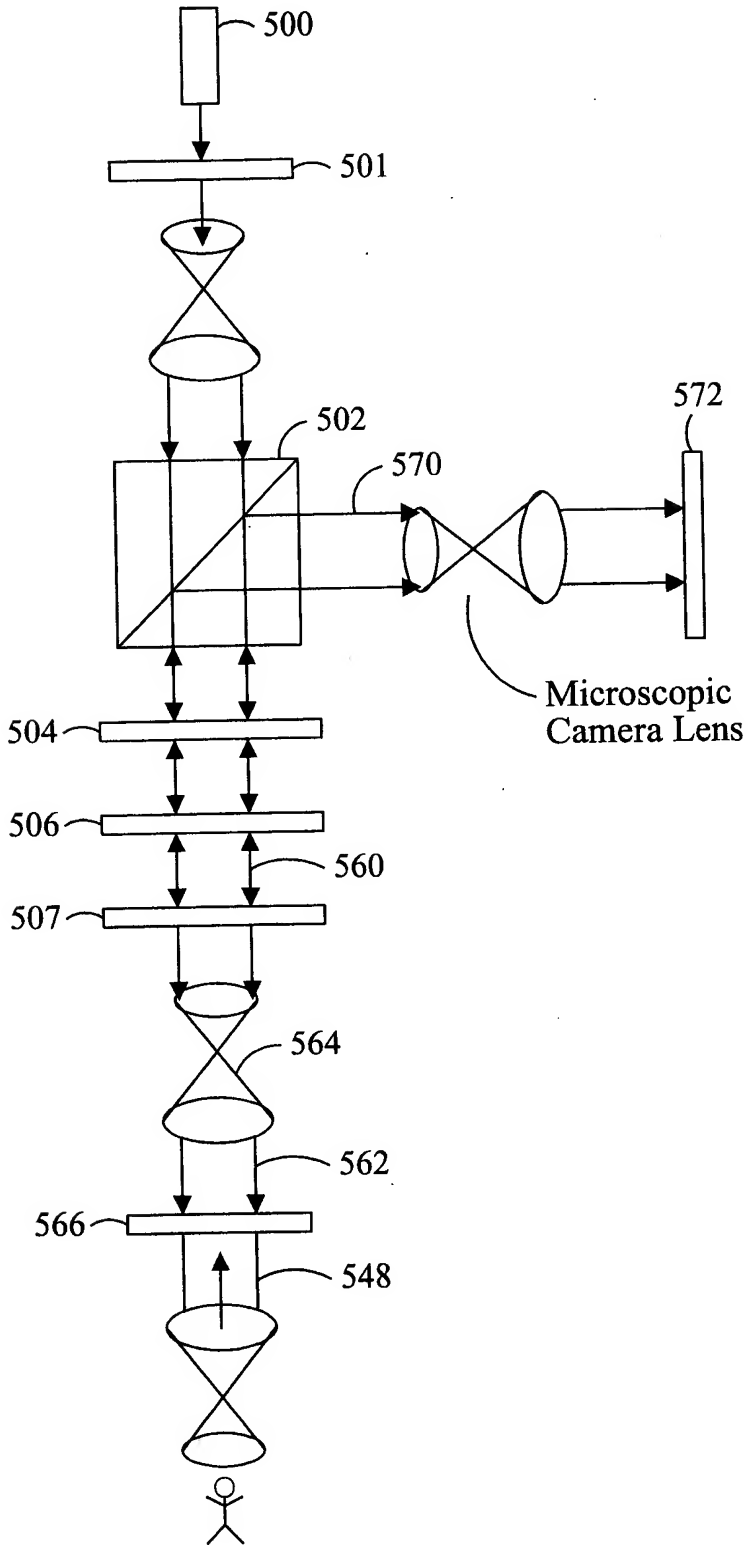

500
501
502
570
572
Microscopic
Camera Lens
504
506
560
507
564
562
566
548

FIG. 14A

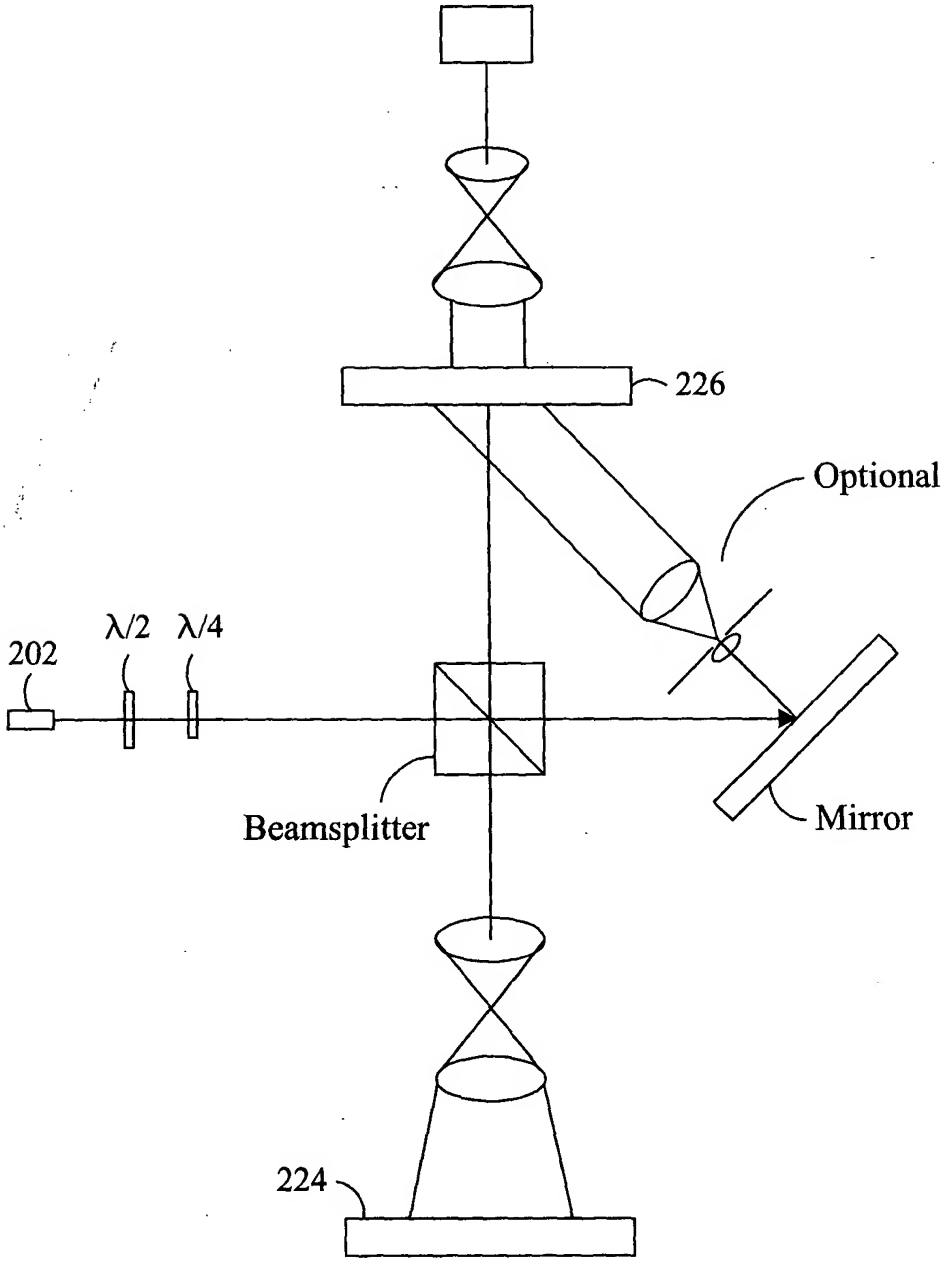


FIG. 14B

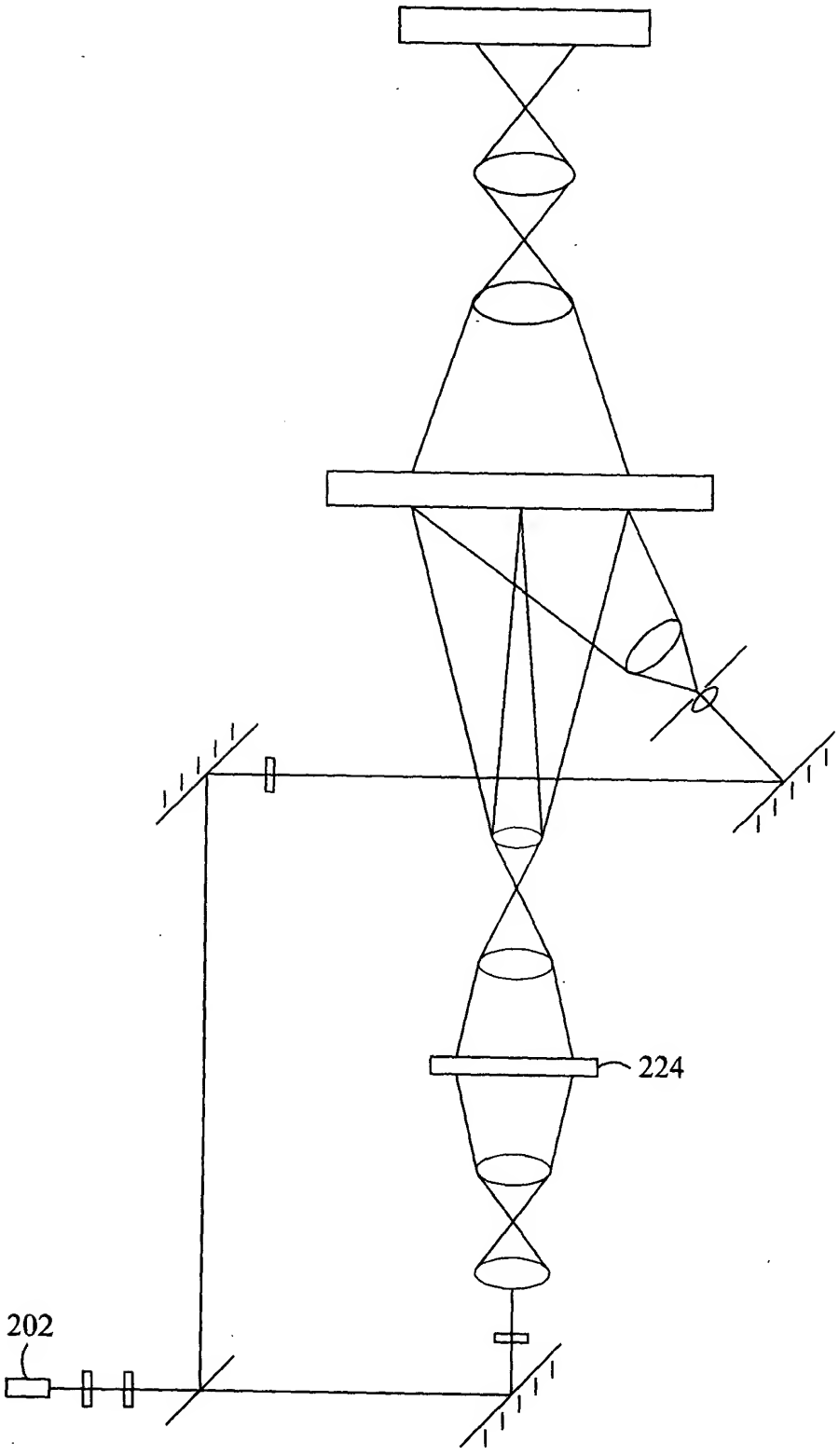
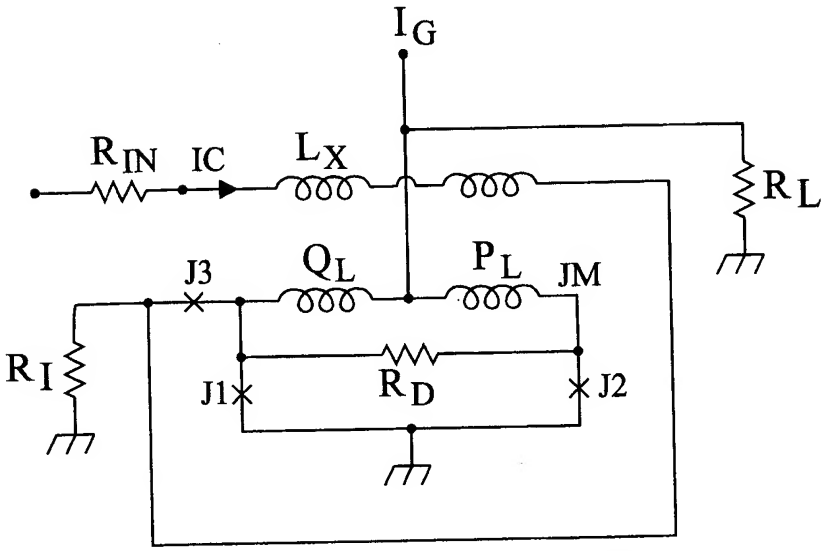
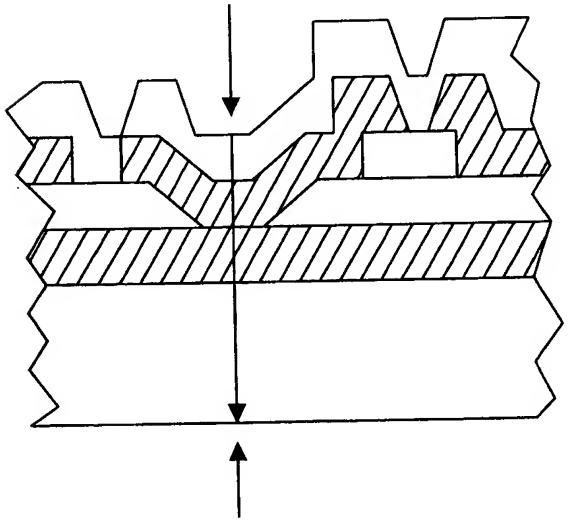


FIG. 14C



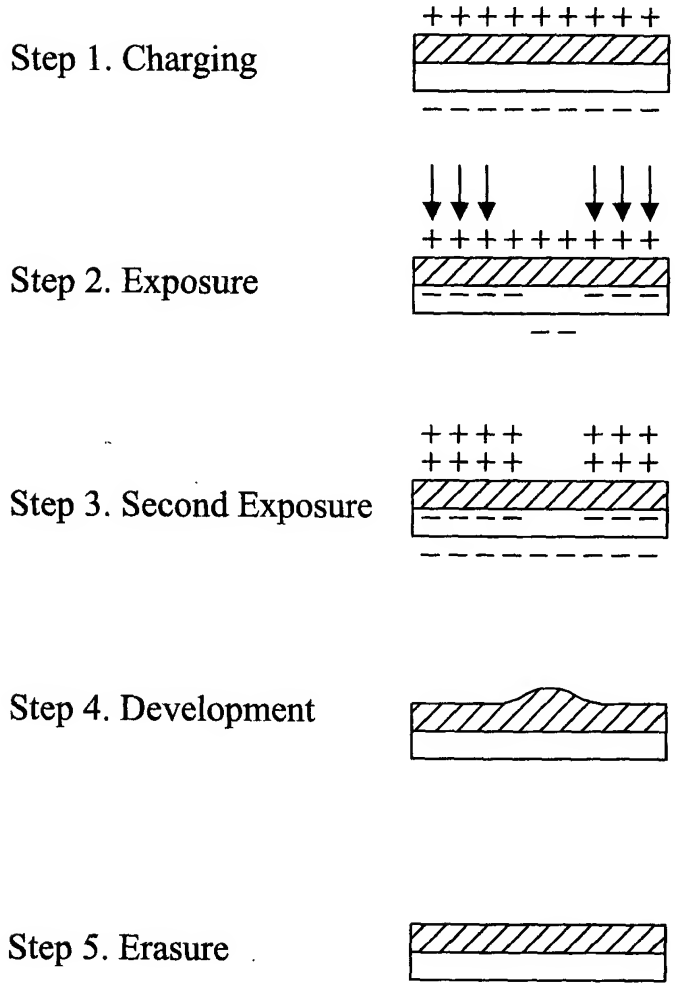
Circuit of Refractory Josephson OR Gate

FIG. 15A



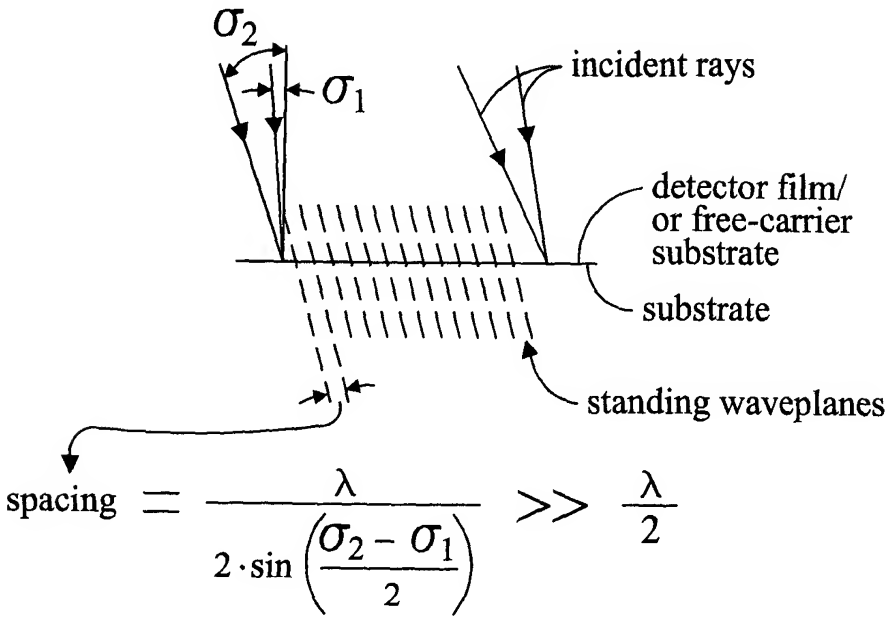
IC crosscut showing Josephson Gate/Junction and area of non-invasive Holographic microscopic inspection using arrangements disclosed.

FIG. 15B



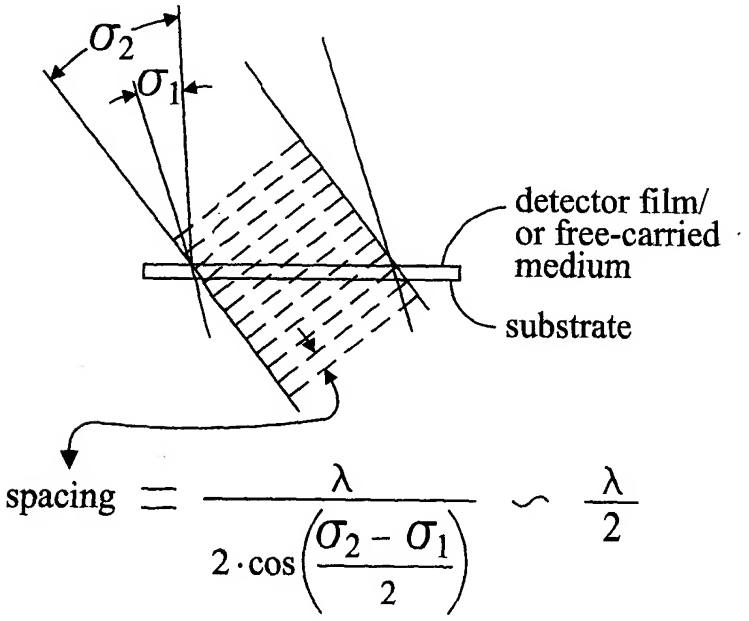
Record-erase cycle for an IR Thermoplastic recording material

FIG. 16



Conventional Method
(single sided Hologram/Interferogram)

FIG. 16A



Double Sided Method
(Holography/Interferogram)

FIG. 16B

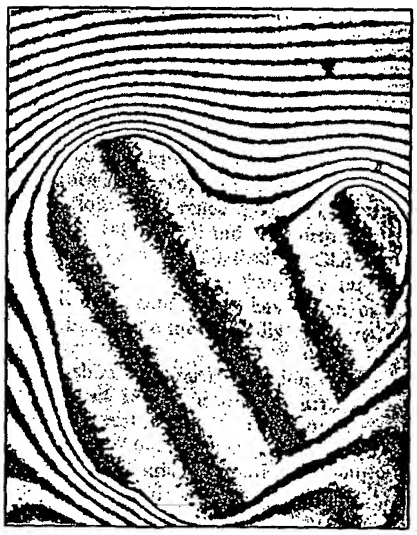


FIG. 17

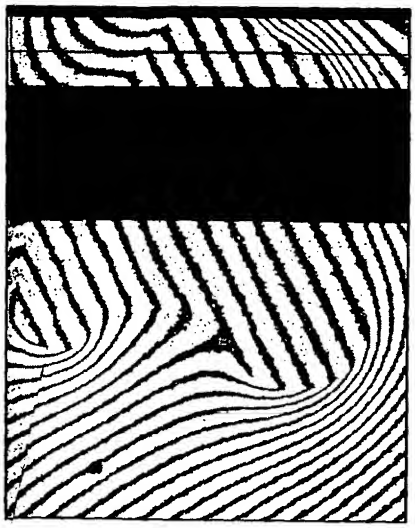


FIG. 18

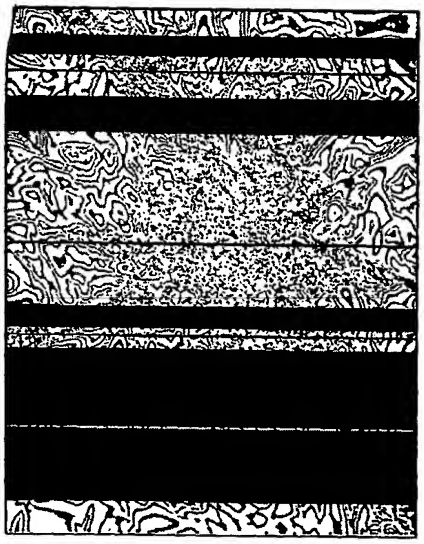


FIG. 19

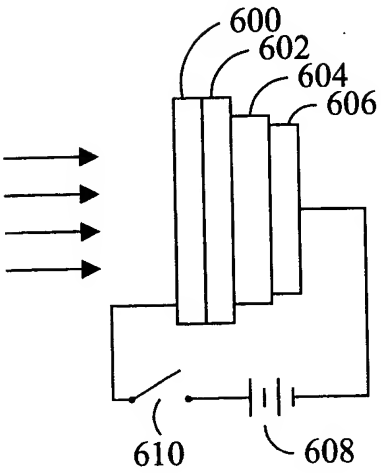


FIG. 20

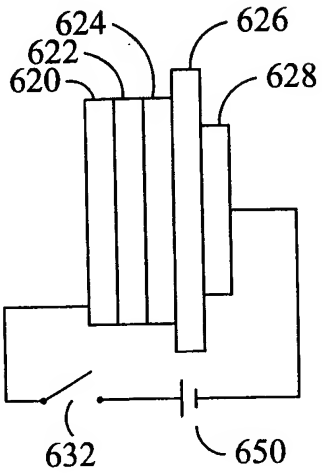


FIG. 21

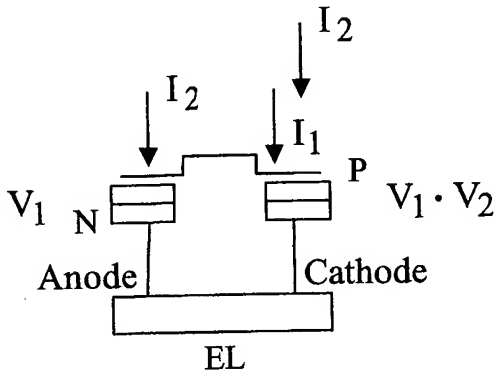


FIG. 22

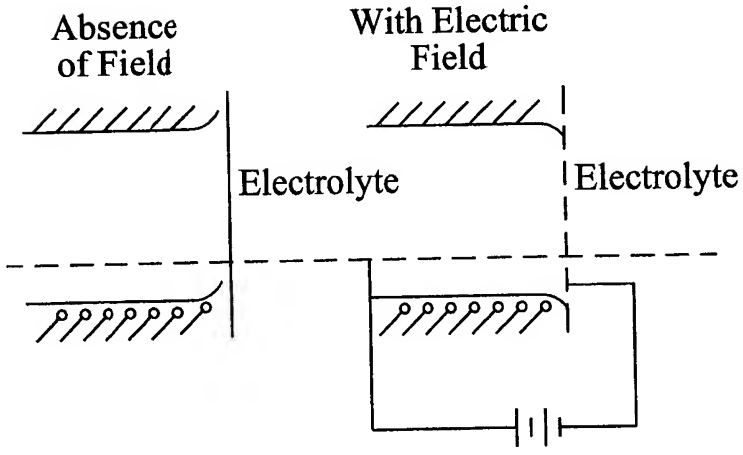


FIG. 23

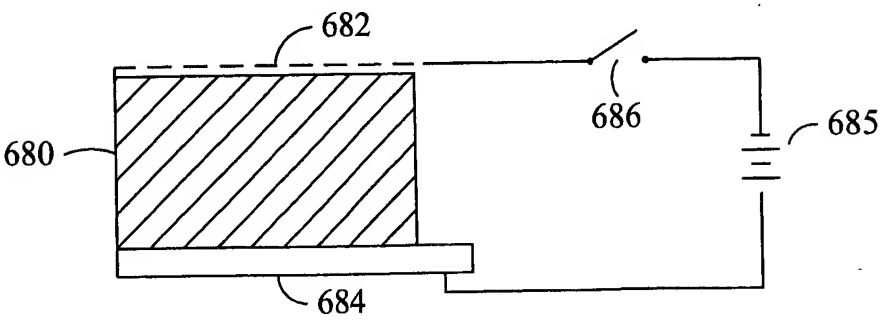


FIG. 24

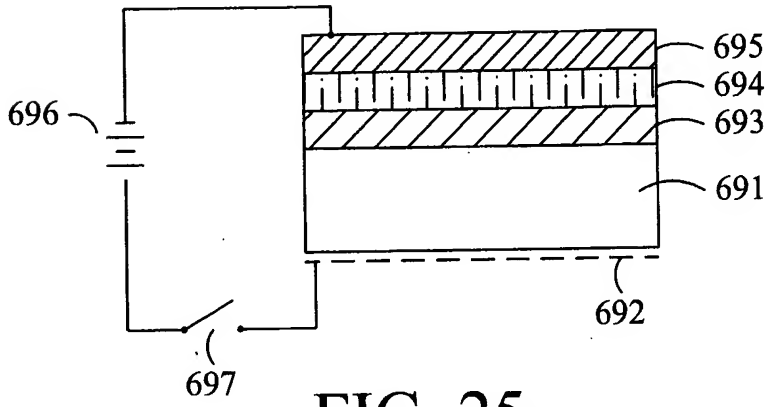


FIG. 25

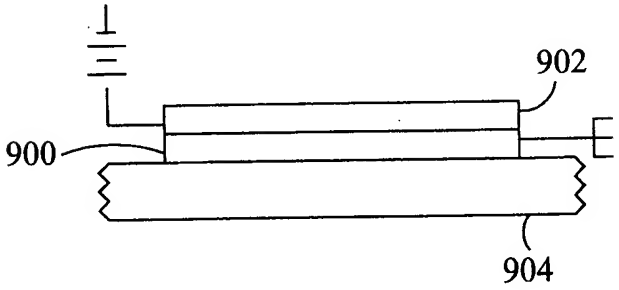


FIG. 26A

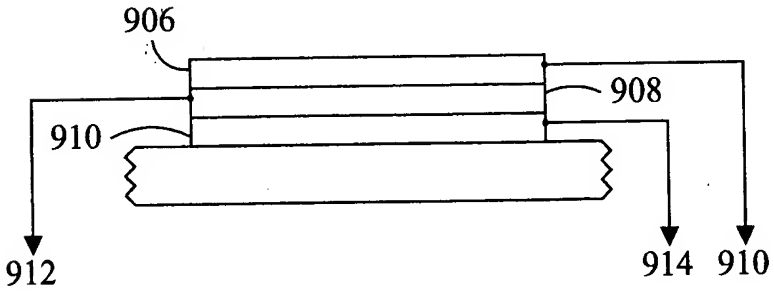


FIG. 26B

Semiconductor layer and orientation thickness of P-N materials corresponds to standing waveplanes in single-sided free-carrier IR Holography

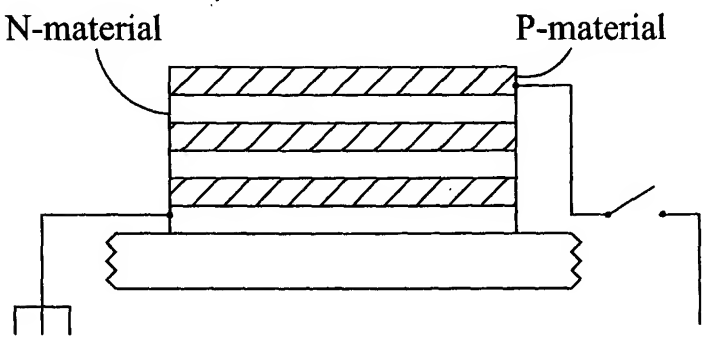


FIG. 27A

Semiconductor orientation and the column dimensions dimensions corresponds to standing waveplanes in double-sided free-carrier IR Holography (Refer to FIG. 16A and 16B as well as FIG. 27A)

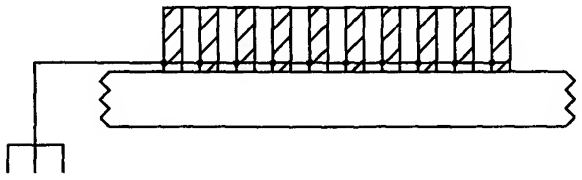


FIG. 27B

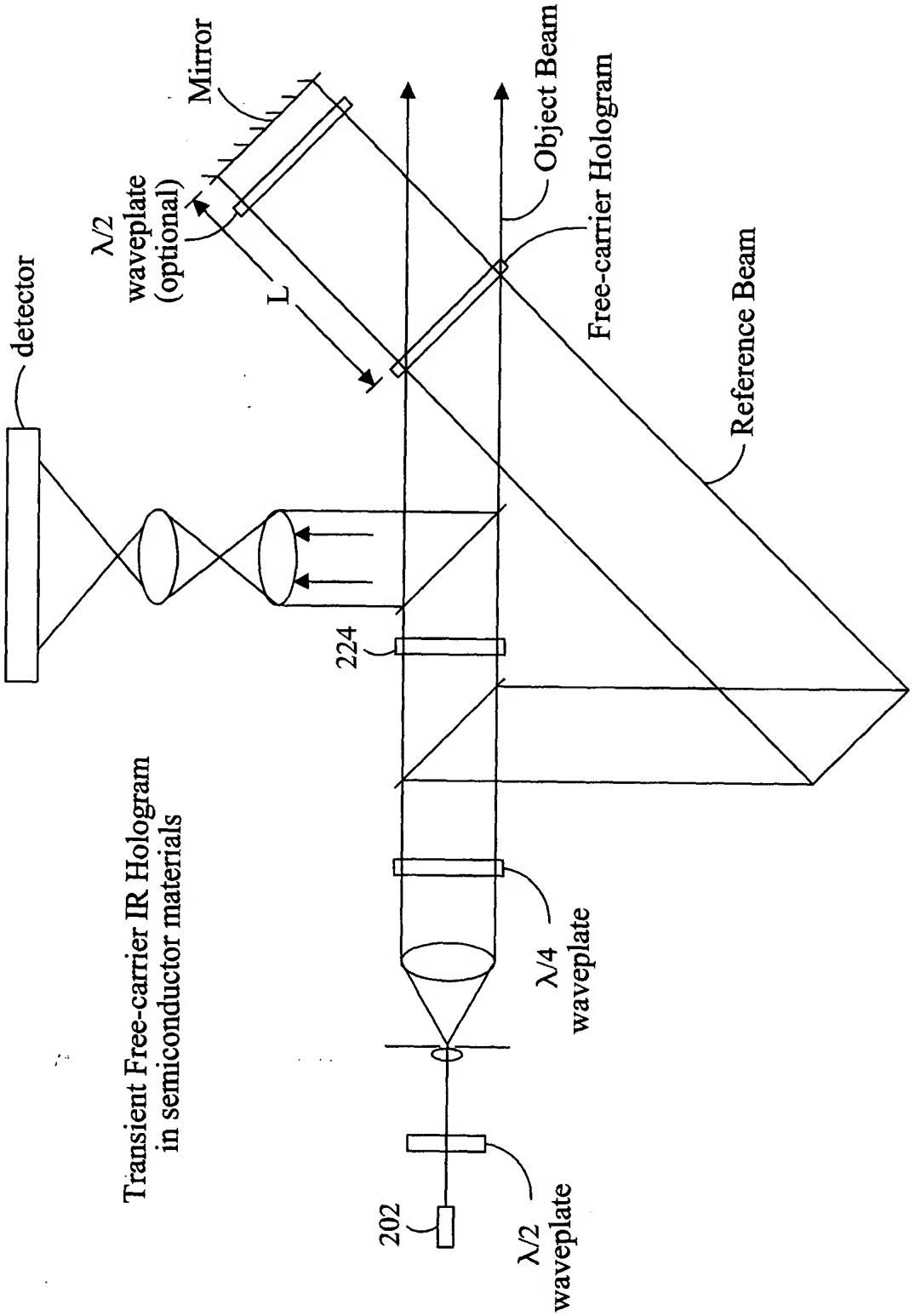

detector
λ/2
waveplate
(optional)
Mirror
L
Object Beam
Free-carrier Hologram
Reference Beam
224
Transient Free-carrier IR Hologram
in semiconductor materials
λ/4
waveplate
202
λ/2
waveplate

FIG. 28

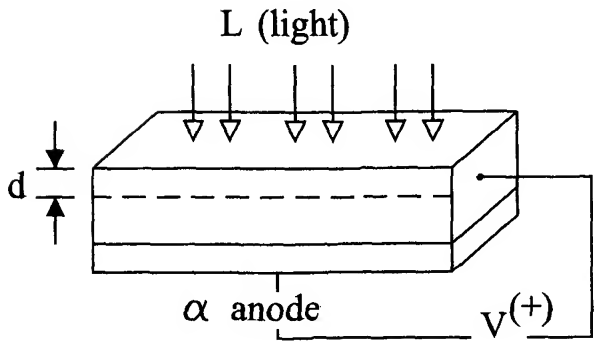


FIG. 29

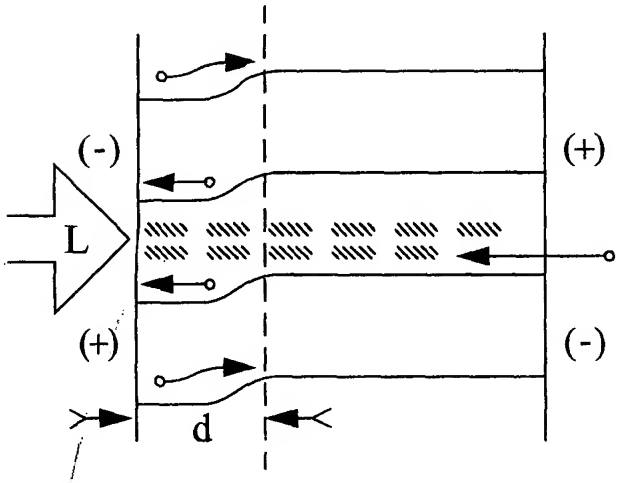


FIG. 30

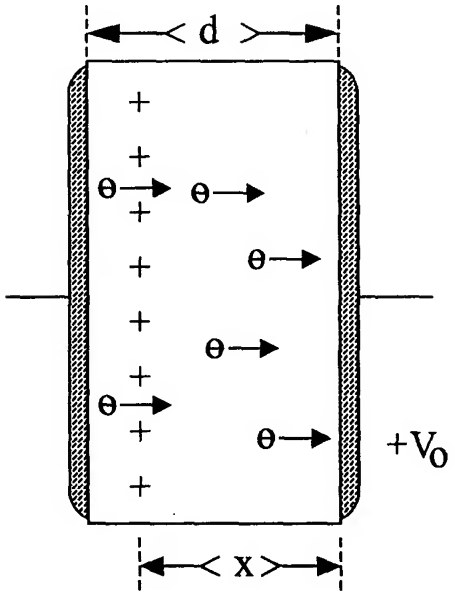


FIG. 31

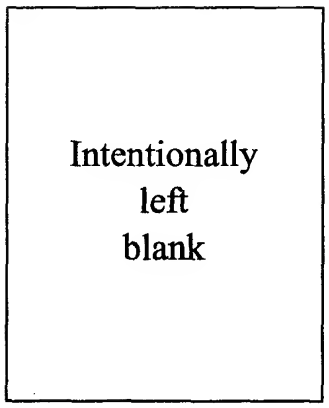


FIG. 32

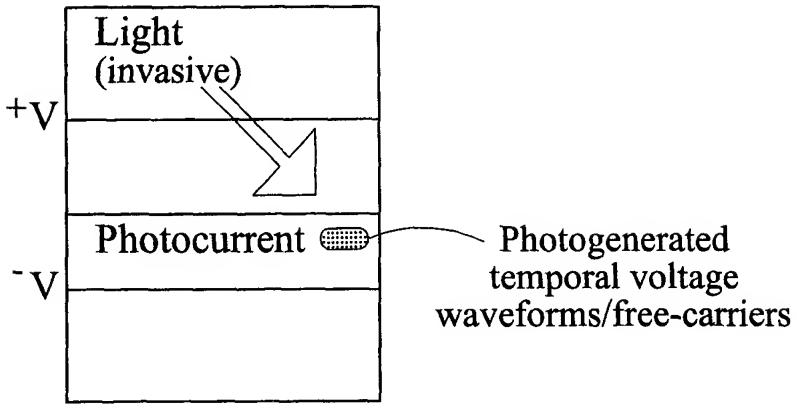


FIG. 33

Intentionally
left
blank

FIG. 34

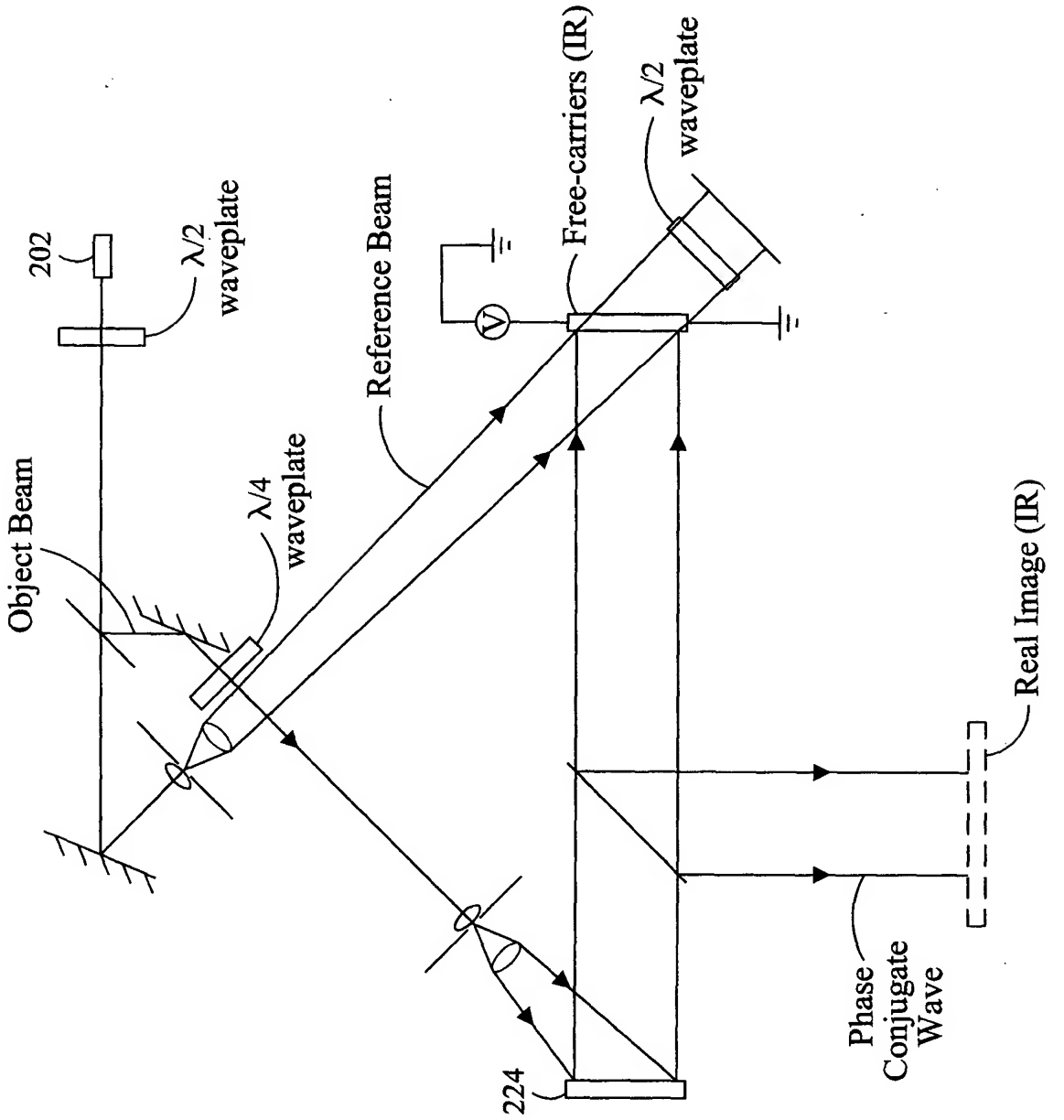
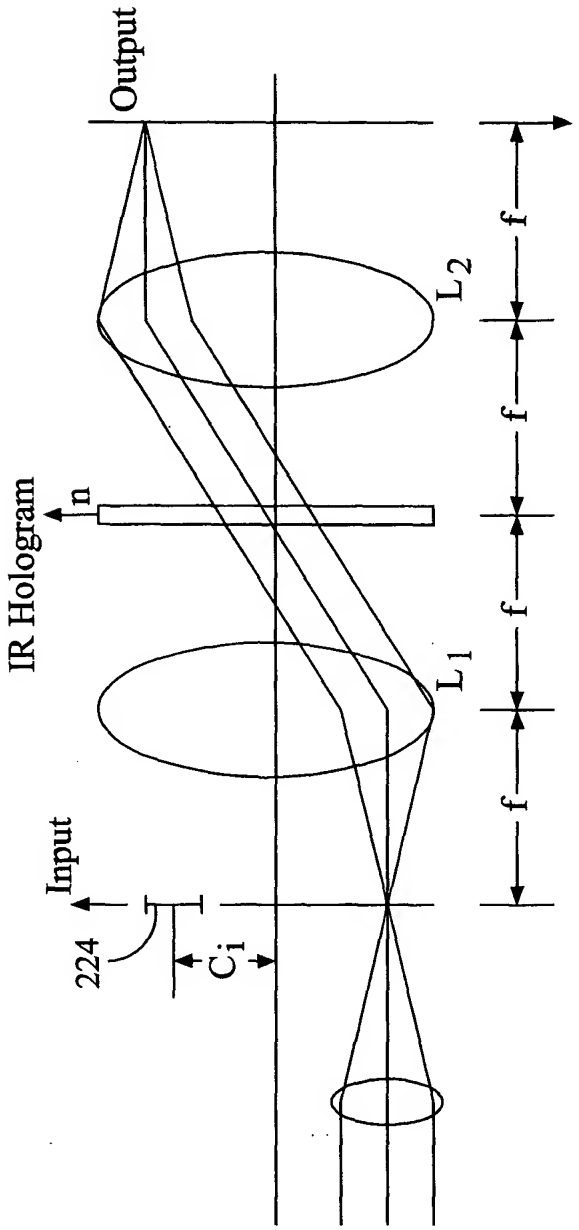

202
λ/2 waveplate
Reference Beam
Free-carriers (IR)
λ/2 waveplate
Object Beam
λ/4 waveplate
Real Image (IR)
Phase Conjugate Wave
224

FIG. 35

FIG. 36



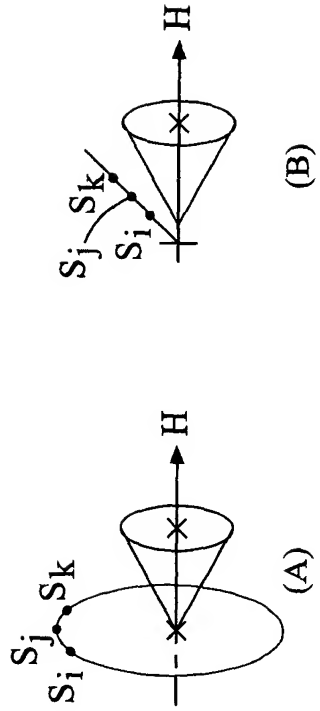


FIG. 37A

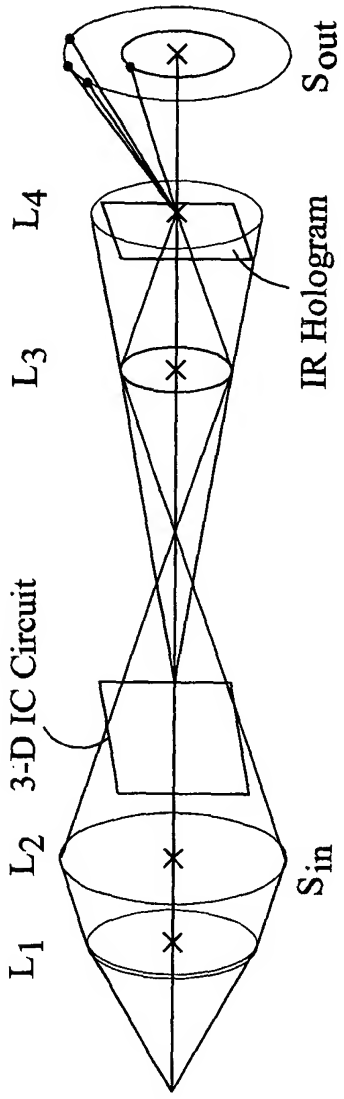


FIG. 37B

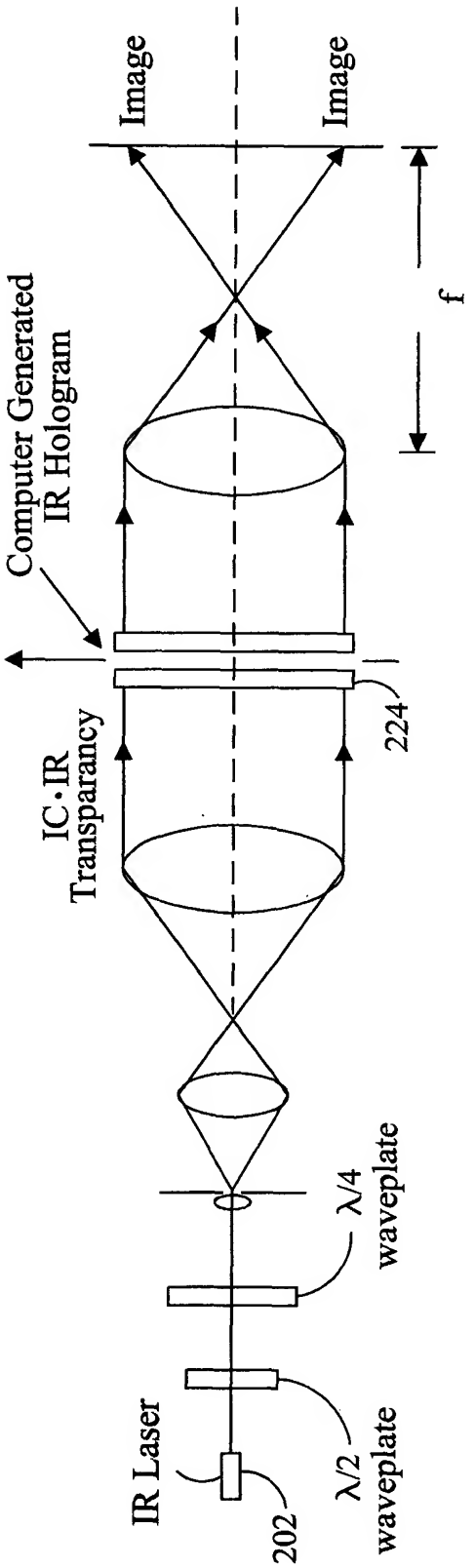


Image
Image
f
Computer Generated
IR Hologram
224
IC·IR
Transparancy
λ/4
waveplate
λ/2
waveplate
IR Laser
202

FIG. 38

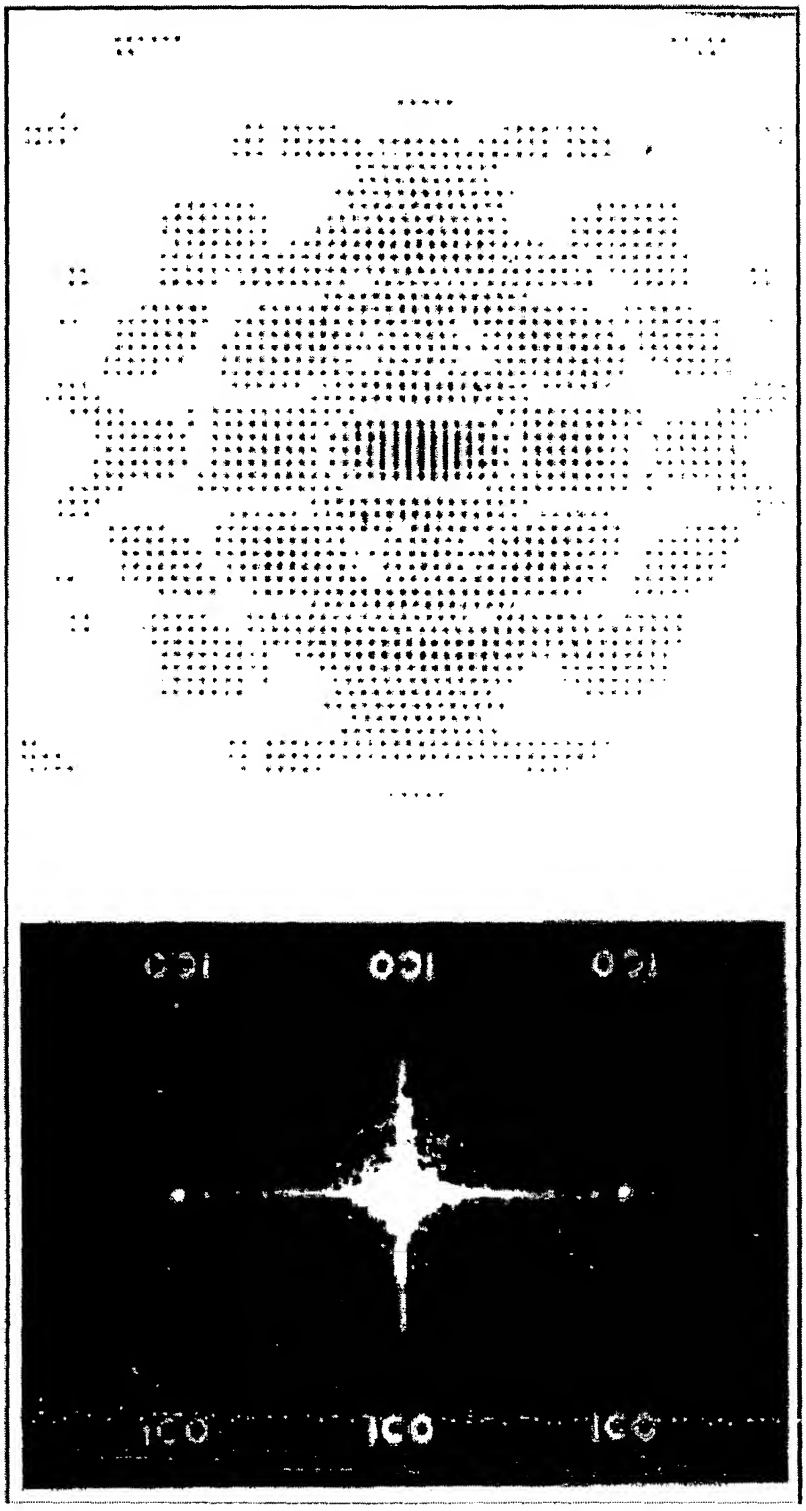


FIG. 39

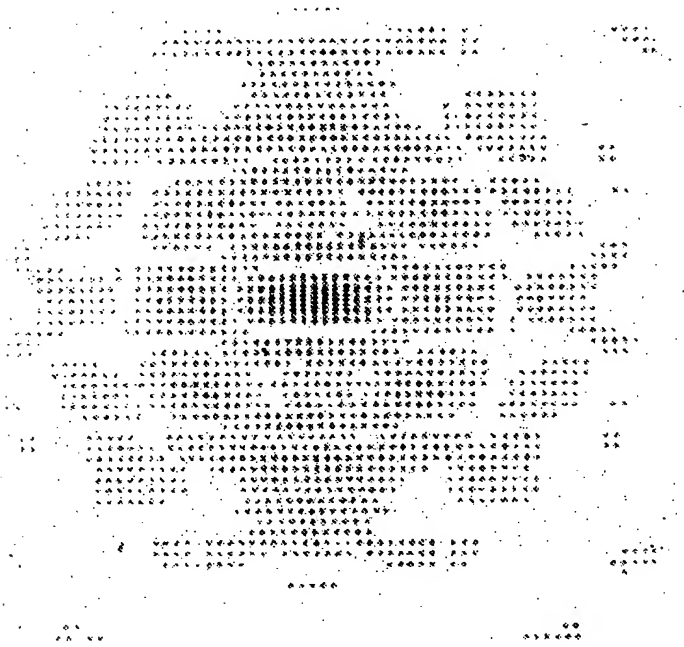


FIG. 40A

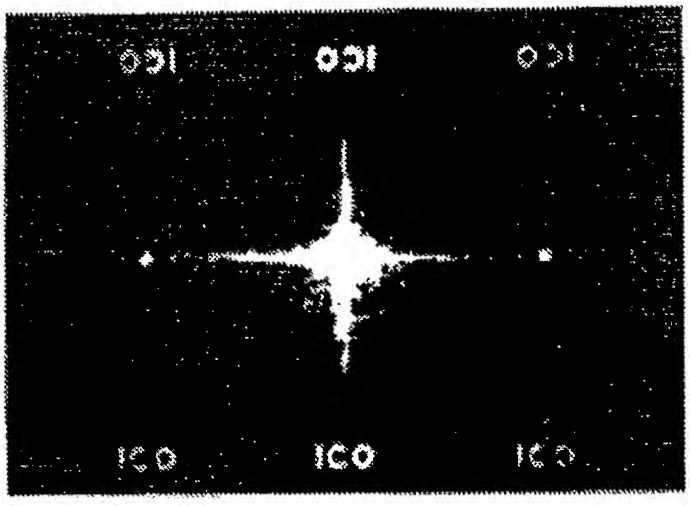


FIG. 40B

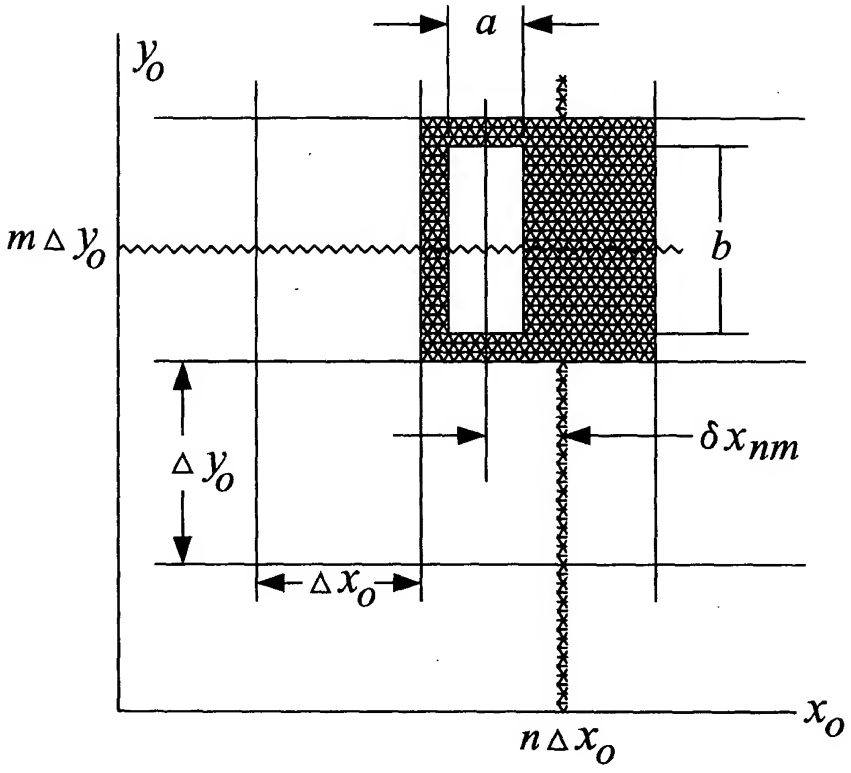


FIG. 40C

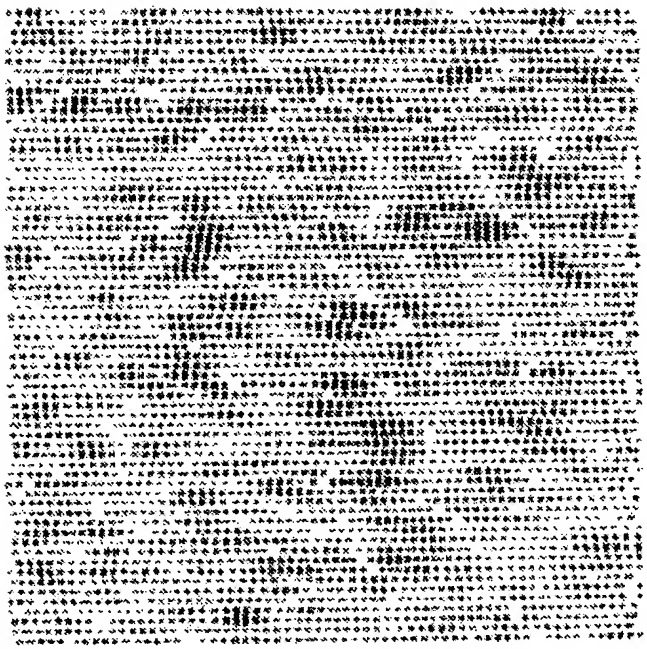


FIG. 41A

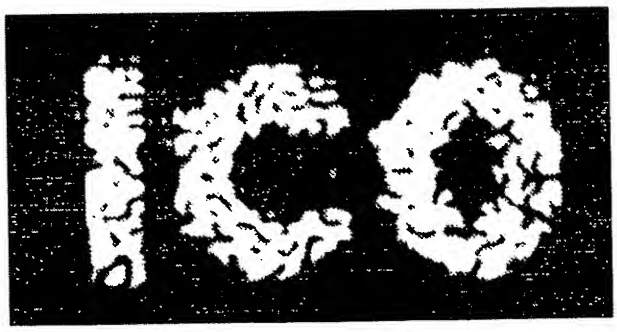


FIG. 41B

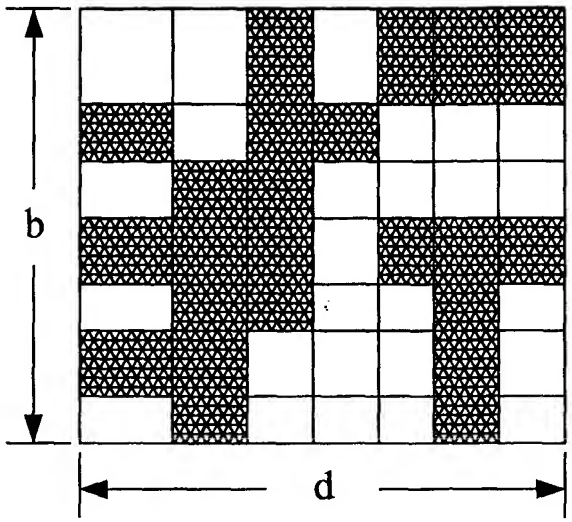
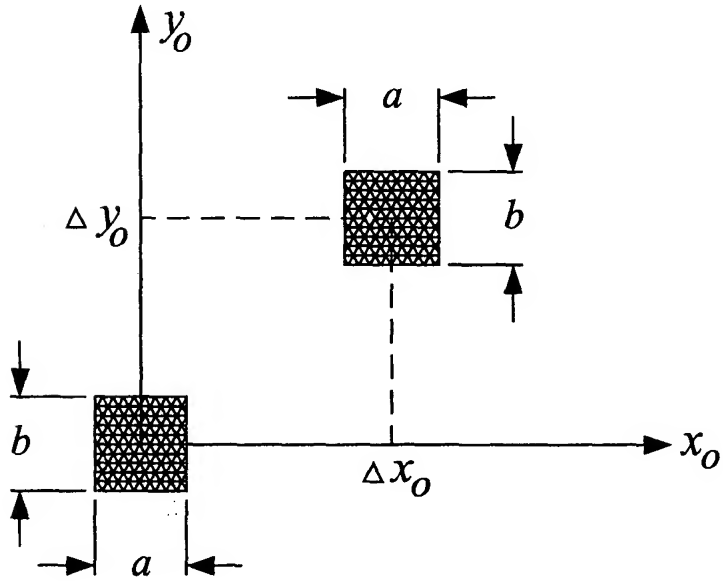


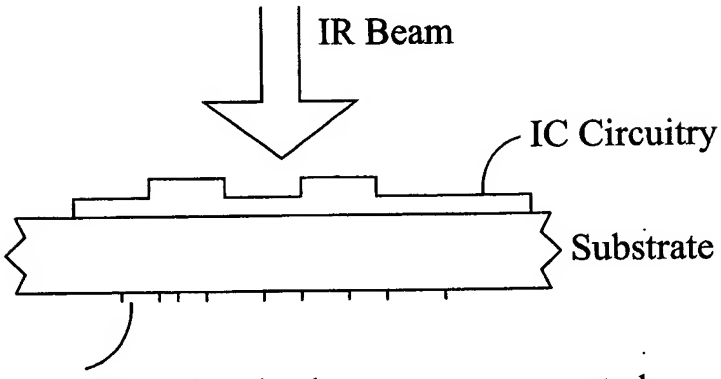
Illustration showing arrangement of
generalized Gunary detour-phase IR Hologram

FIG. 42

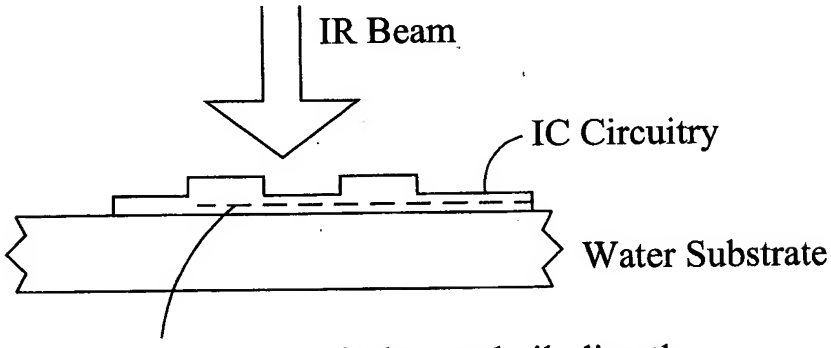


IR Diffracton at a Rectangular Aperture

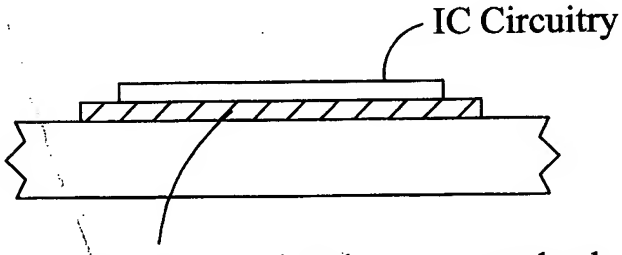
FIG. 43



IR Hologram printed on back, computer generated or directly exposed for testing of IC functionality



HOE - IR Holographic Optical Element built directly into IC's circuitry gives optimal interferogram if IC lithography and operating voltage parameters are okay. Can also be set up to detect failure conditions or other operations.



IR computer generated Hologram can also be ion-beam etched/implanted into wafer substrate.

FIG. 44